**WHAT IS CLAIMED IS:**

1) An artificial heart comprising:

one right blood chamber, said right blood chamber having an elongated shape essentially directed up and back, said right blood chamber having one right inlet port for blood to enter, said right inlet port having means for attachment to the right atrium,

one posterior outlet port for blood to exit said right blood chamber, said posterior outlet port being located above and behind the right inlet port, said posterior outlet port having means for attachment to the main pulmonary artery, said posterior outlet port either including or being adjacent to the valve for the main pulmonary artery,

one left blood chamber, said left blood chamber having an elongated shape essentially directed up and to the right, said left blood chamber having one left inlet port for blood to enter, said left inlet port having means for attachment to the left atrium,

one anterior outlet port for blood to exit said left blood chamber, said anterior outlet port being located above and to the right of the left inlet port, approximately at the same height as and in front of said posterior outlet port, said anterior outlet port having means for attachment to the aorta artery, said anterior outlet port either including or being adjacent to the valve for the aorta artery,

the spatial arrangement between said blood chambers being such that, when they are simultaneously fully expanded, a part of the right blood chamber, which projects onto the anterior thoracic wall coincides with the projection onto said anterior thoracic wall of a corresponding part of the left blood chamber, is posterior to said corresponding part of the left blood chamber.

2) An artificial heart as defined in claim 1, wherein both said blood chambers are soft and flexible.

3) An artificial heart as defined in claim 1, wherein both said blood chambers have independently varying discharging volumes.

4) An artificial heart as defined in claim 1, wherein both said blood chambers are multiple-walled.

5) An artificial heart as defined in claim 4, wherein the variation of said discharging volumes is achieved by the addition of a fluid into the interstitial space between the walls of said multiple-walled blood chambers.

6) An artificial heart as defined in claim 4, wherein each of the innermost walls of both multiple-walled blood chambers are made of pericardium single piece.

7) An artificial heart as defined in claim 1 wherein said right blood chamber extends through said posterior outlet port and is directly attached to the main pulmonary artery and said left blood chamber extends through said anterior outlet port and is directly attached to the aorta artery.

8) An artificial heart as defined in claim 1 wherein said blood chambers have expanded capacity between 20 mL and 120 mL each, preferably between 40 mL and 100 mL each.

9) An artificial heart as defined in claim 1 comprising:

-a compressing mechanism located inside the mediastinum to simultaneously effect the expansion and contraction of said blood chambers.

10) An artificial heart as defined in claim 9 wherein said compressing mechanism comprises:

-an outer compressing chamber enclosing both said blood chambers, said outer compressing chamber having one or more moving surfaces and four or more individual openings, four of which said individual openings spatially coinciding each with said left inlet port, right inlet port, anterior outlet port and posterior outlet port,

-a compressing fluid filling the space contained between said outer compressing chamber and said blood chambers, said compressing fluid transmitting the forces from said moving surfaces of said compressing chamber to effect the expansion and contraction of said blood chambers,

-a power source located inside the mediastinum that moves said moving surfaces.

11) An artificial heart as defined in claim 9 wherein said compressing mechanism comprises:

-an outer compressing chamber characterized by its low volume change upon changes in internal pressure occurring during use, said outer compressing chamber enclosing

both said blood chambers, said outer compressing chamber having five or more individual openings, four of which said individual openings spatially coinciding each with said left inlet port, right inlet port, anterior outlet port and posterior outlet port,

-a compressing fluid filling the space contained between said outer compressing chamber and said blood chambers,

-means for connecting said outer compressing chamber to a source of additional said compressing fluid, said compressing fluid effecting the expansion and contraction of said blood chambers, said expansion and contraction being effected by withdrawing and introducing said compressing fluid from and into said compressing chamber respectively.

12) An artificial heart as defined in claim 10 wherein said compressing fluid is glycerine.

13) An artificial heart as defined in claim 11 wherein said compressing fluid is a gas.

14) An artificial heart as defined in claim 1 comprising:

-two compressing mechanisms located inside the mediastinum to independently effect the expansion and contraction of each said blood chambers.

15) An artificial heart as defined in claim 14 wherein at least one of said compressing mechanisms comprises:

-at least two semi-rigid moving surfaces, each directly in contact with each of said blood chambers, said semi-rigid moving surfaces effecting the expansion and contraction of said blood chambers,

-at least one power source located inside the mediastinum that moves said semi-rigid moving surfaces.

16) An artificial heart as defined in claim 14 wherein said compressing mechanisms comprise:

-an outer compressing chamber enclosing both said blood chambers, said outer compressing chamber having two or more moving surfaces and four or more individual openings, four of which said individual openings spatially coinciding each with said left inlet port, right inlet port, anterior outlet port and posterior outlet port,

-an inner wall dividing the space contained between said outer compressing chamber

and said blood chambers into two subspaces isolated from each other: a right subspace and a left subspace, said right subspace surrounding said right blood chamber and said left subspace surrounding said left blood chamber,

-a right compressing fluid filling said right subspace, said compressing fluid transmitting the forces from at least one said moving surfaces of said compressing chamber to effect the expansion and contraction of said right blood chamber,

-a left compressing fluid filling said left subspace, said compressing fluid transmitting the forces from at least one said moving surfaces of said compressing chamber to effect the expansion and contraction of said left blood chamber,

-at least one power source located inside the mediastinum that moves said moving surfaces.

17) An artificial heart as defined in claim 14 wherein said compressing mechanisms comprise:

- an outer compressing chamber characterized by its low volume change upon changes in internal pressure occurring during use, said outer compressing chamber enclosing both said blood chambers, said outer compressing chamber having five or more individual openings, four of which said individual openings spatially coinciding each with said left inlet port, right inlet port, anterior outlet port and posterior outlet port,

-an inner wall dividing the space contained between said outer compressing chamber and said blood chambers into two subspaces isolated from each other: a right subspace and a left subspace, said right subspace surrounding said right blood chamber and said left subspace surrounding said left blood chamber,

-a right compressing fluid filling said right subspace,

-a left compressing fluid filling said left subspace,

-means for connecting each said subspace to at least one source of additional said compressing fluid, said compressing fluids effecting the expansion and contraction of each said blood chambers, said expansion and contraction being effected by withdrawing and introducing respectively said compressing fluids from and into each said subspaces.